AMERICAN DYESTUFF REPORTER

A Weekly Publication devoted to

DYESTUFFS, COLORS and ALLIED CHEMICALS

"Circulated Everywhere Dyestuffs are Used"

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"Wipe Out German Trade in America!"

MUST TAKE POSITIVE STEPS TO ANNIHILATE IT EVERYWHERE, DR. PRATT URGES COTTON MANUFACTURERS

A PLEA for the complete annihilation of German trade in America was made by Dr. Edward Ewing Pratt, vice-president of the Pacific Commercial Co. and formerly chief of the Bureau of Foreign and Domestic Commerce, at the meeting of the American Cotton Manufacturers' Association, at the Biltmore, on May 2nd. He declared that "even to-day in this country, after more than a year of war, enemy concerns are permitted to exist and do business." The speaker cited the case of the dyestuff industry, where German distributors are still selling dyestuffs and endeavoring to preserve German trade interests.

He called upon the business men present to take positive steps to annihilate German trade machinery and ended with the following appeal:

"Men, this business of wiping out German trade is our business. It is the business in which we are best fitted. Let us realize the importance of it. Let us accept no reasons, however plausible, as to why German trade machinery cannot be annihilated. Lack of knowledge, inadequate laws, red tape, administrative inefficiency, must no longer interfere. German trade must cease to exist."

Excerpt from Dr. Pratt's address follows:

"The point that is usually overlooked is that this trade war is not something to come, but is now upon us. We are now just as much engaged in a trade war with Germany as we are in a military and naval combat, but, unfortunately, we have entirely failed to recognize this fact, or adequately to mobilize or prosecute this trade war. In consequence the organized program for the trade war is more delayed and more ineffective than our lamented aeroplane program, and, as in other parts of our war program, our long-suffering allies are carrying the burden.

"The worst of it is that there seems to be little or no recognition on the part of our business community of the significance of a trade war, or of the part they are prepared to take, and can take, in winning the war. Much less is there any realization at Washington of the tremendous offensive weapon that we have ready at hand, but which lies unused; even worse than unused; the effectiveness of this weapon is being seriously impaired through neglect and even by willful if unthinking, sabotage.

"If we can definitely deprive the German commercial party of the hope of regaining immediately her lost trade, we will deprive them finally and completely of the possibility of a commercial victory in any sense of the word. If we can impress on the German commercial party the fact that German trade machinery is definitely and completely destroyed, we can withdraw to a very large extent the enthusiasm and

the hope of victory of the commercial party in support of the war. This trade war, then, here and now, is a real belligerent measure.

"Even to-day in this country after more than a year of war, enemy concerns are permitted to exist and do business. Some of these have been subjected to a thin coat of whitewash administered by the Custodian of Alien Property. But their organizations exist, they continue German to a very considerable degree, in sentiment and in personnel, and will be ready to go out on behalf of Germany when the war is over, if, indeed, they are not doing so now. The installation of a representative of the Alien Property Custodian is not enough. The affairs of every German concern should be wound up, the property sold outright to Americans, and the name abolished. But, more important, a new organization, an American organization, should take its place.

There is no need for me to tell a group of textile men that German trade is masquerading in the guise of American trade. I have only to point to the dye business, and to ask if the German distributors are out of business, or are they holding on for grim death, hoping for the end of the war when they can flood our market with German dyes, and stifle our young and growing dyestuff industry. Only last week the representative of a concern now changed in name but in fact the successor of one of the German dyestuff distributors, offered a concern in this town dyestuffs under their own, the German, trade name. Why, I ask the Alien Property Custodian, have firms, once completely German, still openly so, and even now endeavoring to preserve German trade interests, been permitted to go on and do business; why has the Alien Property Custodian permitted the change of a name to purify a German concern, reeking with plans to further German trade interests now and after the war?

"We must destroy German trade not only in this country, but abroad, especially in the few still remaining neutral countries German trade must cease to exist."

Artificial Daylight Produced By Chemically Treated Glass

AMONG the exhibits at the recent Textile Show of interest to all concerned in the handling of dyed fabrics or the matching of colors, was one of a new glass of American manufacture which it is claimed will so filter artificial light of any kind that it takes on the properties of true daylight. The one fact worthy of mention about this glass is that it is not a moulded glass, and herein lies its value. A moulded blue glass gives off blue light, which is not a true daylight, and no colors or combination of colors have been found that make it possible to make a moulded glass that will give off true daylight. It is absolutely necessary that blue be eliminated in any glass that is to rival the day in its light-giving power.

This new glass has the colors on the surface and they are put there in a most interesting way. Clear crystal glass is used and is put in a kiln which is raised from zero to 668 degrees F., which opens the pores of the surface of the glass to a depth of about 1-64 to 1-92 of the depth of the glass. At this point there is injected into the kiln with a gun under pressure the basic color, which is flooded on the surface of the glass, the surface pores of which have been opened. After the basic color has been flooded on the surface the temperature is dropped to zero again, closing the pores and making the glass ready for the next operation.

The second operation is like the first with the exception that the glass in the kiln is raised only to a temperature of 234 degrees F., which opens the pores of the glass to a less depth than the first operation. A mixing color is then flooded over the surface and above the basic color which was flooded on during the first operation. After this is done the glass is again brought down to zero, which closes the pores again.

The third and final operation is then carried out. The glass is put into the kiln again and the temperature raised to 150 degrees F., which opens the pores but to a lesser depth than the first or second operation. With the

pores open a third color called the finishing color is flooded over the surface and the temperature dropped again to zero, thereby finishing the glass.

With the melting point of glass between 1,200 and 1,400 degrees F., it can be seen that the glass in the kiln is never melted, the whole idea being to open the surface pores enough to allow them to take up some of the colors that are flooded over the surface. The cooling processes close the pores which hold the colors in their place.

This process in itself would be an achievement, but there has been invented a cold process for doing the same thing, and this makes the invention doubly valuable.

In the cold process the glass is put under force and a solution of acid and a mineral is flooded over the surface, which makes one of the minerals in the glass soluble. At this point the basic color is puffed over the surface, which has been opened to a very limited extent. After the basic color is puffed on the surface, a wash is added which neutralizes the acid, after which it is taken off and the surface dried.

The process is then repeated with a weaker solution of acid and a mineral, and again one of the minerals in the glass is made soluble, thereby allowing a mixing color to be puffed over the surface just over the basic color added during the first operation. A second wash is added to neutralize the acid solution and the surface is dried again.

The third and final operation consists in flooding the surface with even a weaker solution than was used in the second operation, and, with the pores open, puff on the surface a finishing color, after which the pores are allowed to close, retaining the color that was puffed on. A third wash is then used which neutralizes the acid, after which the glass is dried. It is then ready for use.

The principle of this new glass is that it contains the colors that are necessary to neutralize the yellow rays to be found in artificial light, thereby producing true daylight. The colors necessary to correct the spectrum for nitrogen and tungsten lamps are added during the three processes. Both the hot and cold process produce the same results and the same colors are used in both methods, the only difference being in the method of application.

This new glass has many uses, and it is predicted that it will soon take the place of moulded glass to a large extent, and also be used for work for which moulded glass is impracticable. It is impossible to make a thin moulded glass, and for some uses a thin glass is necessary. And the process used to make this new glass can be used to produce any color of glass, with the result that thin glass of any color can now be produced.

It can readily be seen that if the glass measures up in practise to the standards which it seems to meet in the demonstration shown at the Textile Exhibition it will prove of very great value to dye houses which are constantly called upon to match colors where true daylight is not readily obtainable.

It would seem that this invention, if all that is claimed for it is true, should prove of very decided benefit to the dyestuff industry.

The Bay State Color & Chemical Co. has been incorporated under Massachusetts laws to succeed the Bay State Chemical Co., the change being necessitated through the company's association with the manufacture of aniline colors. The officers of the new company are: Edward J. Feeley, president; John J. Collins, vice-president; Percy L. Hinds, secretary; Frazier L. O'Leary, treasurer. The company's office is at 38 India Street, Boston.

POSITION WANTED

DYESTUFF CHEMIST—Experienced chemist and colorist, desires position with an American dyestuff concern (manufacturing preferred), on technical staff; familiar with all types of anilines, and their application; also have produced commercially a line of standard dyestuffs. Address AMERICAN DYESTUFF REPORTER, Box 50.

Sixty-six Shades in New French Color Card

Claude Freres' Winter List Covers Wider Range Than Latest American Card

Containing, altogether, 66 different shades, the new color card of Claude Freres for the coming fall and winter season, has just arrived in this country. The first impression of the color card is that of variety in shades, both as to the range and the difference between the values of the lighter and darker extremes; the other impression is the richness of the shades. Compared, in a general way, with the 1918 fall season card of the Textile Color Card Association which, moreover, has only 44 shades, it appears that the American shades are, as a whole, much more somber, while in the opinion of some critics, the French shades are richer and purer. Of course, it remains an open question whether the American card boiled down to a smaller number of shades and thus offering less opportunity for mistakes is more desirable at the present than the more extensive French showing.

The first run in the new French color card is a range of six shades, starting with a bright sharp pink (not found either in the American Standard Color Card nor in the American 1918 fall card), and ending with a very dark garnet. Some of the shades between would correspond very nearly with the scarlet and garnet of the Standard Card.

The second range of six gray shades in the French card, called raton, begins with a shade closely resembling the pearl gray in the Standard Card and runs into dark shades which take their place between the colder grays and the fur shades of the American season card. The darkest shade in this French range is very similar to the one called rodent in the American season card.

Next comes a run called "castor" in the French card. The base of this range is like the "champagne" of the Standard Card, the darkest ones corresponding to the "wren" of the American season card.

This is followed by "lumiere defuse," three blues of remarkable brightness not found in the Standard or season American cards. The darkest shade is similar to gentian blue.

Another series of six blues, called "escadres," begins with the "national" blue of the Standard Card, going over into shades corresponding to the "marine" and navies of the American season card.

"Cacao" is the name in the French card of the next following series of rich browns, corresponding to "olive brown," "tobacco," and "chestnut" in the Standard Card.

A run of six shades, called "rouille," begins with a peach shade, which is quite different from the "apricot" in the Standard Card. This range is entirely missing from the American season card, its darkest shades resembling "terra cotta" and "mahogany" of the Standard Card.

Under the name, "indiens," three shades follow in the French card, not

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WRITE FOR SAMPLES AND QUOTATIONS

found in the American season card of the fall, 1918. The middle of the three shades is not unlike the "burnt orange" of the Standard Card, although not as reddish as the latter. The darkest is a brilliant golden brown.

The range called "iris" in the French card contains six shades, the darker ones being quite well matched by the "violet," "petunia" and "grape" of the American season card. The palest French color in this range is not found on the American cards, it being only a lighter shade of violet.

The only green on the French card is represented by three shades, called "malachite." The lightest shade in this range is brighter and more intense than the greens of the American cards. The middle shade, however, could be compared with "myrtle" in the American season card, although the French shade has a more bluish cast.

"Eclats" in the French card stands for three bluish grays, not found in the American cards. The two darkest of this series could be approximately described as the "slate" and "graphite" of the Standard Card, with a bluish caste.

The darkest shade of the three called "broussailes" in the French card is somewhat like the "moss" in the Standard Card but considerably deadened with gray. The other two members of this French run are only lighter shades of the one just mentioned.

"Autrefois" in the French card is not found in the American season card. The darker shades are odd, resembling the liver color. The palest shade is very much like the "blossom" from the Standard Card but not as brilliant. The two darker shades could be approximated by the Standard American "ashes of rose," deadened with gray.

"Azalee' in the French card describes by its name the character of three pink shades. These cannot be matched from any American cards.

Under the name of "pieds d'alouette," follows a range of three blues. The palest is somewhat stronger than "light blue No. 4" in the Standard Card. The second shade in this French range corresponds to "Saxe blue" in the Standard Card, the darkest being similar to the "sapphire" of the Standard card with, perhaps, a little addition of gray.

"Tempete" in the French card stands for three grays. The lightest of these is like a paler edition of the American Standard "nickel," and the darkest like the Standard American "slate," only somewhat lighter.

American Colors Sometimes Too Fast

A SOMEWHAT humorous incident, illustrating that it is sometimes a disadvantage to have American-made colors extremely fast to washing when used for purposes for which they are not intended, occurred recently in the Grand Central Terminal Office Building, New York.

It appears that Fred Wetzel & Co., Incorporated, dealers in dyestuffs, were expecting the receipt of a barrel of American-made safranine. When this barrel was delivered the cartman in charge, without making inquiries as to the exact place of delivery, started out to take it to Mr. Wetzel's office. He rolled the barrel the entire length of the marble-floored corridor and only after he had reached the door discovered that a small quantity of the dye had leaked out and that the corridor had a trail of reddish powder. The janitor, not being familiar with the character of the composition, attempted to clean it up with a pail and mop, the result being that the entire corridor, which extends for 200 feet or more, was stained a beautiful pink, which has so far defied every effort at removal. In this case, at least, we imagine that Mr. Wetzel would have been glad to have had his safranine a little less fast to washing, as we understand he has had some difficulty in adjusting the matter with the New York Central Railroad Company.

Another moral which may be drawn from this story is that manufacturers of dyestuffs should see to it that their containers are absolutely tight. There is no question but that the gradual leaking of concentrated dyestuffs is very likely to cause serious damage to any other goods with which a faulty package may come in contact.

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Creative American Research Essential

THE success of Germany in so completely covering the ground in producing the entire range of synthetic compounds derived from coal-tar crudes, which science has shown to be adapted to practical human wants, has been the chief source of that country's dominance in the industry. It has been seconded by the magnificently organized facilities for research, installed in the German color-works as well as in the German universities and technical schools. This machinery must be duplicated in our own country.

It is most encouraging to note the generous provision made by the leading factors in our young industry, to equip adequate research laboratories, and assure the healthful growth on American soil of this most fascinating and complex branch of human activity.

It is fully recognized that the permanence and commercial effectiveness of the American dyestuff industry will depend largely upon the ability of our tinctorial chemists to forge ahead, to blaze new trails in a forest of practically unbounded possibilities.

A servile, oriental adaptation and imitation of the achievements of European chemists will not suffice. We must train men to be leaders in this field, equal in inventive power, versatility and grasp of the situation to their fellow Americans who have accomplished so much in electrical, mechanical and metallurgical industries.

Publicity for American-made Dyes

WE understand that the leading manufacturers of American dyestuffs—some of them independently and some of them through the newly formed American Dyestuff Manufacturers' Association—have in contemplation an educational campaign which will teach the women of the country the merits of American colors and dissuade them from the mistaken and widely held opinion that only foreign-made colors give satisfactory results.

An interesting effort in this direction is one which will shortly be put into operation by the National Aniline & Chemical Company. They prepared, as mentioned in previous issues of the REPORTER, a very complete exhibit of their products for use at the recent Textile Exhibition in New York City. This Exhibit included, it will be remembered, not only samples of their various products but also a number of comparative dyeings of German colors versus American colors of similar type, the comparative dyeings having been submitted to the same tests for fastness to light, washing, etc. There was also a complete laboratory wherein actual dyeings were made from their own and pre-war colors.

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This exhibit excited such general popular interest at the Textile Show that the Company has now determined to give it wider publicity than was there afforded. They have accordingly arranged with Jordan Marsh & Company of Boston to place the entire exhibit, including the laboratory, on display in that store for a week or so, beginning May 15th. It is also expected that following the appearance of the exhibit in Boston it will be moved to other large cities and displayed in prominent department stores where the buying public will have an opportunity to judge for themselves of the real merits of American-made colors. It is also probable that Dr. Louis J. Matos, of the National, will accompany the Exhibit and thus be in a position to answer intelligently any inquiries which consumers may make.

The REPORTER believes that this is a step in the right direction and that similar methods might be adopted by other concerns, or better yet, by several of them working in common.

New and Cheap Process Reported for Manufacturing Toluol

It is reported from Washington that one Louis Band Cherry, an electrical engineer of Kansas City, Mo., has submitted to the Ordnance Division of the War Department an electro-chemical process, which he claims to have perfected, by which toluol can be manufactured and sold profitably at not to exceed ten cents a gallon.

If Mr. Cherry's process proves to be commercially successful it will have a pronounced influence on the cost of the manufacture of many dyestuffs, as toluol is one of the most largely used dyestuff bases.

Correction

In our issue of May 6th there appeared a description of the exhibit of Frank Hemingway, Incorporated, at the Textile Show, in which certain titles were accredited to some of the gentlemen in charge. It appears that the editor was in error in using these titles and we wish to take this opportunity of correcting any false impression that may have been created.

New Dyestuff Plant

The American Aniline Products Co., 80 Fifth Avenue, this city, has purchased the plant in Nyack, N. Y., built by the Peerless Finishing Works, and more recently owned by the United Piece Dye Works. The plant is to be used by the American Aniline for the manufacture of aniline colors.

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Dyestuff Testing in the Textile Industry

By Edward Wallace Pierce

Chief Chemist of the U. S. Conditioning and Testing Company.

PRIOR to the war nearly all tests of dyestuffs were made by the laboratories connected with the large dealers, most of whom were the agents of foreign companies. The expense of these laboratories was charged against the costs of distribution, which really meant that the consumer paid in the end.

Hand in hand with the testing went a technical service which appeared to be gratuitous, the visits of the dyestuffs demonstrator solving many of the problems of the dyer. It finally came about that the old-fashioned dyer became more scarce and in his place we found younger men who were accustomed to depend on the dealers. Many were unable to match their shades from straight colors, preferring to have their samples matched for them, thus putting the dyehouse practically in the hands of those who sold them the dyes.

A few of the more progressive mills maintained laboratories of varying degrees of efficiency and instituted competitive systems of buying. Some of the best of these laboratories were equipped thoroughly and well repaid the expenditure, but many were operated indifferently, or were in the charge of the wrong men, and only served to maintain a constant hostility with the dyer.

When the speculation period started, shortly after the war, the situation was a most unfortunate one for the consumer, who had no means of determining the value of his purchases. The dyers were forced to adopt new methods and make substitutes and gradually acquired again the resourcefulness that had been a part of the day's work of their predecessors.

The new American factories slowly advanced their output, but on account of various difficulties it was particularly hard to maintain deliveries in accord with a constant standard. The dealers and brokers, selling what was left of old foreign dyes, also found difficulty in obtaining or delivering a constant supply of uniform goods. The result of all this was an endless series of disputes, without a court to dispense justice. As the state of affairs was one particularly affecting the textile industry, and capable of being handled in the same manner as other textile tests, arrangements were made to conduct dye tests from an impartial point of view and, if possible, to prevent a few of the objectionable features of the dyestuff business.

The experiment having proved itself practical, it seems to be to the general interest of the textile as well as the dyestuff industry to review the methods used by the United States Conditioning & Testing Company in order to stimulate testing both among the mills and the new manufacturers and dealers. It is hoped that some day some authoritative body will designate definite and arbitrary methods that all may follow; but until that time comes individual methods will be used. It would be desirable if the Dyestuff Association, the Bureau of Standards or the Bureau of Chemistry would make it a matter of interest and plainly outline some standard methods of testing and thereby eliminate the controversies that may arise through the work of different operators.

The methods that follow are the resultant of ideas gathered from many sources and are those generally in use in dye testing laboratories. It is not the general system that needs standardizing but the many special cases that vary from the general rule.

The first essentials in dye testing are good water and clean, white textiles, then a general cleanliness throughout the entire operation. River water is

bad, particularly with direct cotton dyes, basic dyes, alizarines and extracts. It has a tendency to form lakes which readily wash off and diminish both the strength and brilliancy of the dyeing. Of course spring and well waters are worse in this respect than river water, and city supplies now often show the results of various chemical treatments that visibly affect dyeing. Hypochlorites and copper salts are quite likely to be present in sufficient quantity to cause variation in the results. Water treated by zeolites is safe and gives entire satisfaction.

The yarns or fabrics used for the tests should be obtained in large lots to insure uniformity and should be of a good grade. Worsted is preferable to wool and in the case of cotton combed peeler is generally used. Silk in the form of a light colored spun silk is likely to be more satisfactory in every way than the best grade of organzine or thrown silk thread.

Loose cotton may be used, but combed sliver is better, and worsted tops are preferable to raw stock, as level shades are necessary for comparisons. Cloth samples should be quite light in weight because the absence of bulk in the small dye test gives rise to differences in penetration. The less penetration the heavier will be the surface color.

Tests are best carried out on a metric basis and the 10 gram skein is the standard. No account is generally taken of the moisture content of the fiber, but whenever a lot of skeins are wound they should be examined and weighed before dyeing, separating the correct weights from the light and heavy and correcting these before use.

Dyeing operations are best conducted in porcelain beakers or pots on account of the comparative ease with which they may be cleaned. Enameled ware will soon become pitted and yield traces of iron to the hot liquids and cause unevenness or dark stains. Pyrex glass would be satisfactory if a type of beaker could be obtained that was sufficiently heavy to withstand the frequent handling. The American porcelain, made by the Coors factory, is proving as satisfactory in every respect as the imported varieties used before the war.

Smaller laboratories which do but little of this kind of work generally dissolve their dye samples in the proportion of 1 gram to 1 liter and then measure out the quantity needed for each test. When the daily number of samples runs into the hundreds, and most of the samples are small, it is not possible to take care of so many different solutions without a great loss of time and possibility of confusion. In such cases the quantity to be dyed is weighed directly from the dry sample. The error is minimized by the use of balances sensitive to at least 1-10 milligram. The dye sample must be uniform and representative of the larger lot, as many errors occur through careless sampling.

Any abnormal dryness or dampness, or specks and chips of foreign matter, will affect the strength of the dye accordingly. Sometimes the sample contains a lump of either reducing matter (salt, dextrine, etc.) or lumps of con-

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Dyestuff and Color Tests

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centrated dye which later becomes crushed and mixes with the remainder and causes an error which is no fault of the tester. Any time there is a visible lack of uniformity in the dye the sampling should receive particular attention.

The dye pots are heated uniformly in a water bath. Water alone will not raise the temperature high enough to exhaust some dyes, hence other materials are used. Glycerine is the best, but the present price makes it too expensive. Red engine oil, corn oil, paraffin, and other oily substances are available but the effect of an accidental splash of water in the hot oil is likely to be dangerous. Calcium chloride has one serious drawback, shared with all other salts, in that the electrolytic action destroys the solder of a copper bath and leaks soon occur. This feature is overcome by the use of baths made of boiler plate with oxy-acetylene welded joints. The greater weight of the iron prevents sagging of the top and bottom and the chemical action of the salts on the iron is prevented by having a quantity of metallic zinc always in the liquid.

After numbering and recording the samples, the dye baths are prepared, conforming as nearly as possible to practical conditions. A trial dyeing always has one feature that must remain a point of difference and a source of criticism of the practical dyer—the proportion of water to the goods dyed. It is not possible to dye a 10-gram sample in as short a liquor as a 100-lb. lot, and consequently the shade of a dye test is always lighter than a practical dyeing. This, however, does not affect the comparison of two lots of the same dye, for if the conditions of time, temperature and concentration of bath are equal the shades will be proportionate to the strength of the dyes. The average dye test on a 10-gram sample is made with a bath of 500 cc. for 1 hour at a boil or whatever other temperature is demanded by the dye in question.

Methods for Different Dyes

The general methods for the common classes of dyes are as follows:

ACID COLORS ON WOOL.—1 or 2 per cent. dyestuff for colors; 5 per cent. for blacks; 5 per cent. Acetic Acid, or 3 per cent. Sulphuric Acid; 10 per cent. Glauber Salt. Dyed for 1 hour at 200 degrees F.

ACID COLORS ON SILK.—¼ of dyebath is boiled-off liquor; 2 per cent. Dyestuff; 5 per cent. Acetic Acid (or more if necessary). Dyed at 180 degrees F. for ½ hour.

Direct cotton dyes and chrome dyes are also tested on silk in the same way. Basic dyes on silk will require much less Acetic Acid.

CHROME COLORS ON WOOL.—Dyed as Acetic Acid dyes, then treated with ½ per cent. Bichromate of Soda and run 20 minutes longer.

ALIZARINES AND CHROME COLORS ON WOOL.—Mordant, 2½ per cent. Bichromate of Soda; 2½ per cent. Formic Acid; boiled until reduced to a green color. Dye bath, 1 to 5 per cent. Dyestuff, entered at 140 degrees F. and slowly raised to 200 degrees F. and continued until bath is exhausted.

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Members: American Dyestuff Manufacturers Association, American Dyes Institute.

DIRECT COTTON DYES ON COTTON.—Dyed at a full boil for 1 hour with 20 per cent. salt; 2 per cent. Dye for colors; 5 per cent. for Blacks.

BASIC DYES ON COTTON.—Mordant, 5 per cent. Tannic Acid, boiled 1 hour and worked in cooling bath 3 hours, wrung out and fixed with 1½ per cent. Tartar Emetic at 120 degrees F. for 20 minutes and rinsed. Dye bath, 1 per cent. Dyestuff; 5 per cent. Acetic Acid or Alum. Dye at 160 degrees F. for ½ hour. (Auramine must not be dyed at over 140 degrees F.)

SULPHUR DYES.—2 to 5 per cent. Dyestuff for Colors; 10 per cent. for Blacks; equal weight Sodium Sulphide conc.; 1 per cent. Caustic Soda; 50 per cent. Common Salt. Dye at full boil for 1 hour, wring, allow to oxidize in the air, rinse thoroughly, wash in hot soap, rinse and dry.

To the exhausted dye bath add one-half the original quantity of Sodium Sulphide and without the addition of any more dye exhaust the liquor with a new skein, adding 25 per cent. more salt at the end of the first half hour. The second skein is treated as the first and the two together represent the only practical way of testing sulphur dyes.

ALKALI BLUES.—1 per cent. Dyestuff; 5 per cent. Borax. Dye at a 200 degree F. for 1 hour on either wool or silk, wring without rinsing and develop in a cold bath containing 5 per cent. Acetic Acid.

In all cases the skein or cloth should be thoroughly wet out and scoured before entering the dyebath and turned frequently during the dyeing operation.

While the mordants for chrome, extracts and basic dyes are made up in quantities to insure uniformity, and kept in a damp condition in stoneware jars, it has been found that it is very difficult to make two lots of tannin-antimony mordant absolutely identical. For this reason basic dyes are tested on spun silk whenever possible. The ordinary chrome mordant is also quite variable and preference is given to a completely reduced chrome mordant having no oxidizing power.

The use of this non-oxidizing mordant has made possible a more definite test for logwood products. It is well-known that all logwood preparations contain both oxidized coloring matter (Hematine) and unoxidized coloring matter (Hematoxylon). Some dyers require a high percentage of Hematine while others want less Hematine and more Hematoxylon. The method of dyeing on a Chrome and Tartar mordant yields a blue-black with all soluble Logwood preparations but gives no idea of the extent of the oxidation. The following method, however, shows approximately the amount of each ingredient. It is approximate, rather than exact, because the very nature of Logwood baffles exactness, as it oxidizes somewhat while the test is being made.

A single chrome mordant is prepared, for both parts of the test, which represents only Chromium Salts and contains not the slightest trace of Chromic Acid.

MORDANT.—3 per cent. Bi-Chromate of Soda; work the wool at a boil for 15 minutes, then add 5 per cent. Sulphuric Acid; boil for one-half hour longer.

This results in practically a complete fixation of all the available Chromic Acid on the wool fiber. The wool is then introduced into a fresh bath containing about 10 per cent. Bi-Sulphite of Soda, 5 per cent. Sulphuric Acid and worked for 20 minutes or longer at 100 degrees F., whereby the Chromic Acid is absolutely reduced to Chromium Salts. The skeins are rinsed thoroughly in water only, and kept in a wet condition.

DYE BATH.—5 per cent. Hematine Crystals or other Logwood preparation. Dyed at 200 degrees F. for one hour, the skein rinsed so that the rinsing runs back into the dye bath.

This first dyeing on the green, non-oxidizing mordant utilizes only the fully oxidized Hematine that exists in the sample and leaves the un-oxidized Logwood in the exhaust.

A second dyeing is then made in the exhaust of liquor as follows:

Add to the bath one-half per cent. Bi-Chromate of Soda and immediately

add another skein mordanted as above. The residual Logwood is then also converted into Hematine and dyes a shade which varies in proportion to the amount of Logwood which was originally in the un-oxidized condition. After one hour's boiling this bath is also exhausted completely and the entire amount of coloring matter is divided between the two skeins in direct proportion to the degree of oxidation.

Comparing the Samples

After dyeing, rinsing and drying the temporary tags are replaced by the permanent tickets and a comparison of the dyeings made. Most colors after leaving the drier are altered in shade. This is not a permanent alteration, as a rule, but is due to the absence of moisture. As soon as the fibers have regained their normal moisture the proper color will return. Some dyes, being very sensitive to acids and alkalies, may show irregularities and streaks. The slight amount of sulphurous and other acids in the air will darken Congo and other Direct Reds, but a few minutes in a closed box with a piece of cotton moistened with Ammonia will restore the color. Metanil Yellow, Azo Blue, Chrysoidine and Bismarck Brown are also dependent on their acid content for their shades. Bordeaux Extra on the other hand is easily affected by Ammonia and alkalies in general. These conditions being adjusted, the samples may be compared by daylight, from the north sky, or under a daylight lamp.

It is not safe to simply estimate differences in strength by comparison of two dyeings, but a series of dyeings in different strengths should be made and a selection of the two that match will determine the strength within 5 per cent. The figure 5 per cent. seems to be the limit of accuracy of dye tests, as the eye is seldom able to distinguish a less difference. Comparison may only be made between dyeings made at the same time. Tests made at a prior date may have undergone a change or have been affected by some influence not present in the later test.

DYESTUFFS

AND

CHEMICALS

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Where greater exactness is required, and where quicker results are wanted, a colorimetric method is preferable. The first essential to a colorimetric comparison is that the two samples to be compared shall be identical in shade and composition. The color of the solution has no direct bearing on the shade the dyestuff will yield on fabrics but with straight products the depth of color of the solutions is in direct ratio to the strength of the dye. The first step is to ascertain whether the dye is a straight product or a mixture. Two methods are in use, either sprinkle lightly on a piece of damp filter paper, or white blotter, or on the surface of cold water. The first, when dried, gives a permanent record, but the second is more convenient. Sometimes Alcohol is used instead of water for special cases.

With colorimetric tests we must always prepare solutions at the start and a concentration of 1 gram to 1 liter is quite convenient. In making the solutions we also observe the relative solubility of the samples and when all the dye has dissolved a drop of each on filter paper will reveal the presence of any suspended insoluble matter.

Simple colorimetric comparisons are made in Nessler jars or graduated cylinders, by daylight. The jars must be equal in diameter. This is shown by the graduations being at the same point on each pair. A set of twelve matched jars for such tests has been very difficult to obtain but it is not difficult to select pairs from any large stock. A graduated pipette is used to transfer a quantity of the solution to the jars. Only enough is used to give a distinct color, not a deep shade. The type is diluted until the jar is about one-half full, then the second sample is diluted only enough to match the depth of the first color.

As the reading of the test is much affected by many outside influences, such tests are best done on a shelf across a window with a ground or opal glass screen as a background. A little practice will enable anyone to judge when the two solutions match. It is well to have a series of colored glasses to check up the reading made with the naked eye. A set of the Wratten light filters, mounted on glass, gives a complete range and enables the matches to be made with an accuracy of about 2 per cent. When the solutions match, the strengths of the dyes in question are in a direct ratio to the volume of the solutions. For example, a match was made with the type diluted to 360cc. and Sample X to 280cc. Dividing 280 by 360, and multiplying by 100, we get 77.8 and report that type equalling 100, Sample X equals 78 or is 22 per cent. weaker than type.

With such colorimeters as the Campbell-Hurley and the Kobel, more dilute solutions are used and these are measured by adjusting the depth of the solution that must be placed between the eye and the light in order to match each other. As the observation is made through an eye-piece, and the field is a circle divided in halves, it is easier to determine when an exact match has been obtained than by means of the open cylinders. As both these instruments have been thoroughly described many times it is hardly necessary to go into further details. A modification of the Campbell-Hurley is necessary. The plunger case in the stock form of this apparatus is connected with the right hand jar by a rigid glass connection without joints and makes the instrument difficult to take a part for cleaning after each test. A flexible rubber tube is substituted and makes the operation more simple. The Wratten light filters are useful here also for detecting any slight differences that may escape the unaided eye.

The indentification of dyestuffs is a subject that covers too large a field to include it in this paper. There are many books of reference and systems in use, but the simple tests given in the Schulz & Julius tables will be found quite helpful. The systems outlined by Arthur G. Green and Mulliken are more complete, but depend on the use of Titanous Chloride and Rongalite C. As these are now almost impossible to obtain, the usefulness of the systems is in temporary suspense.

Micro-chemical methods, as sug-

gested by Chamot, offer many possibilities in the dyestuff field and may develop in the near future. Spectroscopic methods of identification require operators and apparatus beyond the reach of the ordinary laboratory and the instruments are now difficult to obtain.

Tests for Fastness

Dyed samples should be put through a series of tests for fastness to the various influences. There is a need for a standard set of tests at this time. Government goods are tested according to certain specifications, which are needlessly severe for general use. Where a test requires a strictly negative report there is no difficulty, but where the fastness is of an intermediate degree it is now almost impossible to find two observers who agree.

Tests of fastness to light were discussed in a previous paper (*Textile World Journal*, Jan. 12, 1918), in which an ultra-Violet lamp was described. There is still a need for a simple means of measuring the intensity of the radiation. The Bureau of Standards recommend the proto-electric cell. The near future may produce a commercial type of this, and thus open the way for a more definite expression of the fastness of dyes. There will always remain, however, a difficulty of comparing the fastness of different depths of color on account of the inability of the eye to determine when fading begins and how far it has proceeded.

Dyestuff Standardization

There has been some discussion of dyestuff standardization and much confusion as to what is meant or expected. There are two kinds—a strictly scientific method which will report the actual purity of each dye just as heavy chemicals are described, also a practical method which only requires that each manufacturer shall put his products on record and make deliveries according to the standard he has made for himself. Both kinds of standardization will require the adoption of a set of rules for testing. Until uniform methods are adopted there will be some confusion. It can only be hoped that the foregoing outline of methods in use will make it easier for producer and consumer to understand each other. There need be no dispute where there is an understanding, and if the consumer uses the same method of making a test as the producer the findings will agree.

The American manufacturers have declared themselves against the old prewar methods of business and when the war is over every bit of independence the consumer has gained will aid in keeping the American textile industries free from foreign influence.—*Textile World Journal.*

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S

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Scott & Williams, Inc., New York; Silk Publishing Co., New York; S. K. F. Ball Bearing Co., Hartford, Conn.; Smith, Drum & Co., Philadelphia; Stafford Co., Readville, Mass.; Stamford Extract Manufacturing Co., New York; W. R. C. Smith Publishing Co., Atlanta, Ga.; Smith & Cooley, Stafford Springs, Conn.; Steel Heddle Manufacturing Co., Philadelphia; Stein, Hall & Co., New York; Sterling Color Co., Inc., New York; Southern Textile Bulletin, Charlotte, N. C.; Alfred Suter, New York; Swan & Finch, New York; Signode System, Inc., Chicago, Ill.; Southern Textile Machinery Co., Paducah, Ky.; Sweater News, New York; Stoughton Mills, Boston; South Acton Woolen Co., Boston; R. T. Sullivan & Co., Newton Lower Falls, Mass.; John T. Slack & Co., Springfield, Vt.; Screw Machine Products Corp., Providence, R. I.; Stillwater Worsted Co., New York.

T

C. J. Tagliabue Manufacturing Co., Brooklyn; Takamine Laboratory, Inc., New York; W. O. & M. W. Talcott, Providence, R. I.; American Textile, Boston; Textile Colorist, Philadelphia; Textile Finishing Machinery Co., Providence, R. I.; Textiles Co., Boston; Lewis E. Tracy Co., Boston; Transmission Ball Bearing Co., Buffalo, N. Y.; Truck & Tractor Co., Inc., New York; Tillotson Humidifier Co., Providence; Textile World Journal, New York; Templeton Manufacturing Co., Cambridge, Mass.; Talbot Mills, North Billerion, Mass.; Textile Color Card Association of the United States, Inc., New York; Taunton Wool Stock Co., Taunton, Mass.

U

U. S. Conditioning & Testing Co., New York; U. S. Gutta Percha Paint Co., Providence, R. I.; U. S. Government Exhibit, Quartermaster Corps, Bureau of Foreign and Domestic Commerce, navy clothing exhibits, Department of Agriculture; Universal Winding Co., Boston; U. S. Ring Traveler Co., Providence, R. I.; Underwear and Hosiery Review, New York.

V

Veeder Manufacturing Co., Hartford, Conn.; Victor Ring Traveler Co., Providence, R. I.

W

Wardwell Braiding Machine Co., Central Falls, R. I.; W. J. Westaway Co., Ontario, Canada; Westinghouse Electric and Manufacturing Co., Pittsburgh, Pa.; Whitin Machine Works, Whitinsville, Mass.; Woonsocket Machine & Press Co., Woonsocket, R. I.; Charles D. White, Uncasville, Conn.; J. H. William Co., Millbury, Mass.; Jos. M. Wade Publishing Co., Boston; Warner Manufacturing Co., New York; Watson-Flagg Engineering Co., New York; Williamsburg Chemical Co., Inc., Brooklyn; Thomas H. Wilson, Inc., New York; Worumbo Co., New York; West End Thread Co., Millbury, Mass.; J. K. & L. S. Wiener, New York.

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